In the Claims

Please cancel Claims 1, 3, 5, 7-15 and 17-26 and add new claims 27- 48. The claims currently pending in the application are as follows:

1 – 26 (cancelled).

27. (new) A system for coupling a replica of a rapidly-varying electronic signal to and/or from a remotely-located device under test, the system comprising:

a light source;

an optical fiber having a proximal end and a distal end;

an optical circulator optically interposed between the light source and the proximal end of the optical fiber; and

a reflection-mode electroabsorption modulator optically coupled to the distal end of the optical fiber, the electroabsorption modulator comprising electrical terminals configured to couple electrically to the device under test.

28. (new) The system of claim 27, in which:

the rapidly-varying electronic signal comprises a rapidly-varying electronic measurement signal;

the system is operable to couple a replica of the rapidly-varying electronic measurement signal from the device under test;

the light source is a continuous-wave light source;

the optical circulator comprises, in order, a first port, a second port and a third port, the first port optically coupled to the light source, the second port coupled to the proximal end of the optical fiber; and

the apparatus additionally comprises a photodetector optically coupled to the third port of the optical circulator, the photodetector operable to generate the replica of the rapidly-varying measurement signal in response to light generated by the light source and modulated by the electroabsorption modulator.

29. (new) The system of claim 28, additionally comprising an electronic measurement instrument electrically coupled to the photodetector.

30. (new) The system of claim 28, additionally comprising a bias voltage source electrically connected to the electroabsorption modulator.

31. (new) The system of claim 30, in which:

the electroabsorption modulator has a bias voltage-dependent transfer function; and

the bias voltage source is configured to provide a bias voltage that linearizes the transfer function of the electroabsorption modulator.

32. (new) The system of claim 27, in which:

the rapidly-varying electronic signal comprises a rapidly-varying electronic stimulus signal and a rapidly-varying electronic measurement signal;

the system is operable to couple a replica of the rapidly-varying electronic stimulus signal to the device under test and concurrently to couple a replica of the rapidly-varying electronic measurement signal from the device under test;

the light source is a modulated light source operable to modulate light in response to the rapidly-varying electronic stimulus signal;

the optical circulator comprises, in order, a first port optically coupled to the light source, a second port coupled to the proximal end of the optical fiber and a third port; and

the apparatus additionally comprises a photodetector optically coupled to the third port of the optical circulator, the photodetector operable in response to the modulated light generated by the modulated light source and additionally modulated by the electroabsorption modulator to generate a signal comprising the replica of the rapidly-varying measurement signal.

33. (new) The system of claim 32, additionally comprising a bias voltage source electrically connected to the electroabsorption modulator.

34. (new) The system of claim 33, in which:

the electroabsorption modulator has a bias voltage-dependent transfer function; and

the bias voltage source is configured to provide a bias voltage that linearizes the transfer function of the electroabsorption modulator.

35. (new) The system of claim 27, in which:

the rapidly-varying electronic signal comprises a rapidly-varying electronic stimulus signal;

the system is operable to couple a replica of the rapidly-varying electronic stimulus signal to the device under test; and

the light source is a modulated light source operable to modulate light in response to the rapidly-varying electronic stimulus signal.

36. (new) The system of claim 35, additionally comprising a bias voltage source electrically connected to the electroabsorption modulator.

37. (new) The system of claim 36, in which the bias voltage source is configured to provide a bias voltage that maximizes light absorption by the electroabsorption modulator.

38. (new) The system of claim 27, additionally comprising:

a biasing circuit arranged to bias the electroabsorption modulator; and

an ac coupling in series with the electrical terminals.

39. (new) The system of claim 27, additionally comprising contacting probe tips configured to couple the electrical terminals to the device under test.

40. (new) The system of claim 27, additionally comprising non-contacting probe tips configured to couple the electrical terminals to the device under test.

41. (new) The system of claim 27, additionally comprising an impedance-matching network configured to couple the electrical terminals to the device under test.

42. (new) The system of claim 27, additionally comprising an antenna configured to couple the electrical terminals to the device under test.

43. (new) The system of claim 27, additionally comprising an electromagnetic wave directional coupler configured to couple the electrical terminals to the device under test.

44. (new) A system for coupling a DC balanced replica of a rapidly-varying electronic signal to and/or from a remote device under test, the system comprising:

two systems in accordance with claim 27;

a biasing circuit arranged to bias the electroabsorption modulators of both systems; and

a DC connection between the electrical terminals of each of the systems and the device under test.

45. (new) A method of testing a remotely-located device under test, the method comprising:

providing an optical fiber extending to the remotely-located device under test, the optical fiber having a proximal end and a distal end;

providing a reflection-mode electroabsorption modulator optically coupled to the distal end of the optical filter and capable of electrical connection to the device under test;

illuminating the proximal end of the optical fiber with incident light;

at the proximal end of the optical fiber, optically separating light reflected by the electroabsorption modulator from the incident light; and

detecting the separated, reflected light to generate a high-speed electronic measurement signal.

46. (new) The method of claim 45, in which:

the electroabsorption modulator has a bias voltage-dependent transfer function; and

the method additionally comprises biasing the electroabsorption modulator to linearize the transfer function thereof.

47. (new) The method of claim 45, additionally comprising modulating the incident light.

48. (new) The method of claim 47, additionally comprising biasing the electroabsorption modulator to maximize light absorption thereof.